Notes.

ALL friends of humanity will welcome with a profound sense of relief the intimation that the representatives of Great Britain, France, Italy, Japan, and the United States, assembled at the Washington Conference, have agreed to the American proposal to prohibit the use of poison gas in warfare. As Mr. A. J. Balfour pointed out, in announcing the adherence of Great Britain, Mr. Root's resolution was, in effect, a re-affirmation of international law as it existed prior to 1915, when it was deliberately violated by Germany. He was conscious, as was M. Sarraut, the representative of France, that the exercise of authority in banning the use of an abhorrent method of warfare was, under present conditions, scarcely practicable, and that whilst the agreement would serve to bind the Five Powers, it would not relieve nations from the necessity of preparing themselves against the use of gas by an unscrupulous enemy. We could not afford to ignore the lesson of April, 1915. The position thus reached by the Washington Conference is as satisfactory as could be expected. It is, in fact, all that was practicable, and it will be welcomed by all the Powers comprising the League of Nations. The issue now rests with Germany. But the moral effect of the action of the Conference will not be lost upon the world.

SIR DAVID PRAIN will shortly retire on account of age from the post of Director of the Royal Botanic Gardens, Kew, which he has held since 1905, and the First Lord of the Treasury has appointed as his successor Dr. A. W. Hill, who has been Assistant Director of the gardens for the last fourteen years, and was previously fellow and dean of King's College, Cambridge, and University lecturer in botany. Sir David Prain was born in 1857, and entered the Indian Medical Service in 1884, when he was almost at once seconded for service in the Botanic Garden at Sibpur, Calcutta, as curator of the herbarium, in 1898 succeeding the late Sir George King as superintendent. During this period his activities included the duties of professor of botany in the Calcutta Medical College, Director of the Botanical Survey of India, a trustee of the India Museum, and fellow of the Calcutta University. Upon the retirement of Sir William Thiselton-Dyer in 1905 from the directorship of the Royal Botanic Gardens at Kew, Sir David Prain was appointed his successor, and he has worthily maintained the high traditions of his post, the highest and most important of its kind in the British Empire. He has also been president of the Linnean Society of London (1916–19) and treasurer of the Royal Society since 1919, besides serving on numerous boards and committees of biological associations, where his well-balanced judgment and large experience have made him welcome. On entering on his duties at Kew he found them so exacting that his favourite botanic studies have been curtailed; with his coming release from official labours he will, no doubt, be able to devote himself to original work once more. Dr. Arthur Hill, who succeeds to the office of Director, has travelled in South America and tropical Africa; he has also been largely responsible for the laying-out of British cemeteries in France and Italy.

AN expedition, consisting of Prof. J. W. Gregory, of Glasgow University, and his son, Mr. Christopher J. Gregory, which has for its primary object the investigation of some features in the mountain structure of north-western Yunnan and western Szechuan, expects to leave for Burma at the end of March. The area is one of special geological and biological interest. It includes some mountains of which the height varies, according to the available information, from 20,000 to 25,000 ft.; and as these mountains occur in line with the Himalaya and the mountains south of Assam, it has been suggested that they represent a prolongation of the Himalaya and are continuous through China with the main mountain lines of north-eastern Asia. This view is opposed to the interpretation by von Richthofen that the mountains of this part of China belong to a pre-Himalayan system which they cross almost at right angles, and that the continuation of the Himalayan folds bends back through western Burma and is continued by the mountains on the southern edge of the Eastern Archipelago. It is hoped to obtain evidence for the solution of this problem, and also in reference to the remarkable parallelism of the three great rivers which discharge from south-eastern Tibet. The area is of biological interest in connection with the geographical distribution of the fauna and flora of south-eastern Asia. Some zoological and botanical collections will be made which it is hoped will be worked out in the British Museum of Natural History and in the India Museum, Calcutta. The expedition will travel *via* Rangoon, and hopes to start from Bhamo, near the north-western frontier of Burma, at the beginning of May.

THE council of the Geological Society has this year made the following awards:—Wollaston medal, Dr. A. Harker; Murchison medal, Dr. J. W. Evans; Lyell medal, Dr. C. Davison; Wollaston fund, Dr. L. J. Wills; Murchison fund, Mr. H. Bolton; and Lyell fund, Mr. A. Macconochie and Mr. D. Tait.

BEGINNING on January 26, we have arranged to issue a monthly supplement giving the titles of new books on science and technology published at home and abroad. Publishers have been invited to send us the titles of such additions to their catalogues, and it is hoped to make the lists an index to the chief scientific works issued. Any assistance which may be offered in order to make our lists complete will be welcomed.

AN Exchange telegram published in the *Daily Mail* on Monday announced that after a visit to Mount Kosciusko, the highest in Australia, Sir T. Edgeworth David and Profs. Skeats and Richards have confirmed the discovery in 1893 that the summit of that mountain was formerly covered by glaciers. The new observations show that the glaciation was contemporary with the extinct giant wombat and other giant marsupials, which there is much evidence to show lived in south-eastern Australia when moister climatic conditions prevailed. The date of this glaciation is estimated by Sir Edgeworth David and his colleagues, according to the report, as 100,000 years ago.

AT a meeting of the provisional council of the New Zealand Astronomical Society, held at the Hector Observatory, Wellington, on November 15 last, the following officers were elected:—*President:* Dr. C. E. Adams. *Vice-Presidents:* Hon. Sir Francis Bell, Prof. E. Marsden, Mr. T. Allison, and Dr. C. Munro Hector. *Secretary:* Prof. D. M. Y. Sommerville. *Treasurer:* Mr. C. G. G. Berry. *Editor:* Mr. A. C. Gifford. *Council:* Mr. J. C. Begg, Hon. Mr. Justice Chapman, Prof. C. Coleridge Farr, Mr. E. G. Hogg, Capt. G. S. Hooper, and Mr. J. T. Ward.

UNDER a provision of the Sundry Civil Act of March 4, 1921, Government Departments of the U.S.A. were required to suspend publication of all periodicals except those approved by Congress by December 1, 1921. A resolution empowering the Congressional Joint Committee on Printing to authorise the continuance or discontinuance of these periodicals, among them the *Journal of Agricultural Research,* passed the Senate, but did not come to a vote in the House before the adjournment of the last session of Congress. The *Journal of Agricultural Research* has, therefore, been suspended until its continuance is authorised by Congress.

ON Tuesday next, January 17, at 3 o'clock, Dr. F. H. A. Marshall begins a course of two lectures at the Royal Institution on "Physiology as Applied to Agriculture"; on Thursday, January 19, Mr. Seton Gordon gives the first of two lectures on "Mountain Birds of Scotland" and "Sea-birds and Seals"; and on Saturday, January 21, Dr. Charles Macpherson, organist of St. Paul's Cathedral, commences a course of two lectures, with musical illustration, on "The Evolution of Organ Music." The Friday evening discourse on January 20 will be delivered by Sir James Dewar on "Soap Films and Molecular Forces," and on January 27 by Viscount Burnham on "Journalism."

THE *Echo de Paris* is to be congratulated on the success of the subscription it raised to enable the octogenarian physicist Edouard Branly to continue his experimental work. Like many scientific men, Branly never sought commercial profits out of his discoveries, but the French public was unaware of the straits to which he had been reduced. It is now announced that the Branly Fund exceeds 200,000 francs (about 4000*l*.). Branly was the first to point out in 1890 that the electric resistance of a mass of metallic powder changed enormously when an electric spark took place in its neighbourhood. The resistance generally diminishes, but in a few cases—for instance, with peroxide of lead—it increases when the spark ensues. This was the principle of the earliest form of coherer which in the early days gave such an impetus to radio-telegraphy.

THE first meeting of the Society of Telegraph Engineers was held on February 28, 1872, and the council of the Institution of Electrical Engineers (originally the Society of Telegraph Engineers) is arranging to commemorate the fiftieth anniversary of the meeting. On February 21 at 4 p.m., and on February 22 at 8.30 p.m., Prof. J. A. Fleming will deliver a popular lecture (to which admission is by ticket) on "Michael Faraday and the Foundations of Electrical Engineering." The annual dinner of the institution will be held on February 21, at 7 p.m., at the Hotel Cecil, and in the afternoon and evening of February 23 several members of the institution and others closely connected with the early development of electrical engineering will give short discourses on their reminiscences and experiences during the early history of the electricity supply industry. The speakers will deal both with matters of scientific and technical interest, and also with the effect of legislative action on the progress of the industry.

INFLUENZA seems to be asserting itself with sufficient intensity to call for caution, especially on the part of the individual attacked, although at present the epidemic has not become sufficiently violent to cause alarm. The Registrar-General's weekly returns show that for the ninety-six great towns of England and Wales, including London, the deaths from influenza in the last six weeks have increased from 80 to 418, and in London alone the deaths from this cause have increased from 26 to 151. Fifty-nine per cent. of the deaths in London have occurred at ages above forty-five, whilst between twenty and forty-five years of age the deaths are 27 per cent., and below twenty years of age only 14 per cent. The age-incidence of death in the present epidemic differs from that in the severe epidemic of 1918–19, which for the most part attacked the able-bodied; the present attack has reverted to the incidence shown by the earlier epidemics after 1890. In the six weeks the deaths from pneumonia have nearly doubled, whilst deaths from bronchitis have remained fairly steady. With the abnormally mild weather in December the disease increased, which was a common feature with earlier epidemics, and it is to be hoped that the drop in temperature experienced in the early days of 1922 will lessen the severity of the attack.

TEMPERATURE in the past year was almost as abnormal as the rainfall, and November was the only month at Greenwich with the mean temperature below the average, whether compared with the normal for sixty-five years, 1841–1905, or with the normal for thirty-five years, 1881–1915, used by the Meteorological Office. The temperatures are given in Fahrenheit, and are chiefly from civil-day observations at Greenwich. The warmest month was July, with a mean of 68·5°, which is 4·8° above the average for sixty-five years, but both in January and October the excess of temperature was rather more than 7°. In November the deficiency was 3·4°, but in December the excess was 4·7°. The mean temperature for the year was 52·8°, which is 2·7° in excess of the yearly normal; this is the highest mean annual temperature on record since 1841, the next highest being 52·0° in 1868 and 1911. In July the mean of the maximum, or highest day temperatures, was 81·6°; there have been only two years since 1841 with a higher mean maximum in July, 81·8° in 1859 and 82·0° in 1868. In January the mean maximum was 50·0°, and January, 1916, with a mean maximum 50·4°, is the only January with so high a mean maximum since 1841. The mean minimum in January is the highest on record. The mean for October, 57·6°, has never previously been equalled at Greenwich, and the high temperatures at the commencement of the month were most abnormal. For the British Isles generally the mean temperature for each month from January to April and in July, September, and October was above the normal in all districts, and in England and Wales there was an excess every month from January to October, except for August, in North-West England, where it was in agreement with the average. The mean excess of temperature for all districts in the British Isles, except the North of Scotland and the English Channel, for the ten months, January to October, was 2·6°; in January the excess was 5·2°, in July 4·3°, and in October 6·9°.

THE United States National Museum (Proc., vol. 59) has published a descriptive catalogue of its collection of Buddhist art, compiled by Mr. I. M. Casanowicz. The collection is large, but it does not seem to possess many objects valuable for their antiquity or artistic beauty, the best being a Japanese bronze statue of Buddha, dated 1648. There is also a good collection of rosaries, examples of magical appliances, and objects used in worship. Mr. Casanowicz has given an interesting introduction on Buddhism and its developments. The pamphlet deserves the attention of all those who are interested in the subject.

THE Journal of the Royal Anthropological Institute, part 1, for 1921, prints the presidential address delivered by Sir Everard im Thurn, which gives an interesting historical sketch of the relations between Europeans and the natives of the South Sea Islands after they were discovered. The state of savagery in which the natives were found does not imply fierceness: they were wild and uncontrolled in so far as they had not been subjected to what we call "civilisation," but they had developed for themselves a certain degree—in many cases a very high degree—of culture. The writer sums up his conclusions thus: "The Islanders were, when Europeans first went among them, not a savage, *i.e.* a fierce race, but were highly cultured, if self-cultured, people, but entirely uncivilised; they were at first puzzled what to make of the civilised, or quasi-civilised, people who went among them, and they only became repellent when they were habitually injured by their visitors."

THE educational work of the Commercial Museum of Philadelphia, as decribed by its curator, Mr. C. R. Toothaker, in Bulletin No. 13 (1920) of the United States Bureau of Education, is partly for business men and partly for the rising generation. Aid is given to the former by the foreign trade bureau of the museum, which publishes two journals, one of them in separate Spanish and English editions. Schools are provided for by official guidance to a study of the exhibits, daily lectures to visiting classes on subjects chosen by the school-teachers, lectures to teachers and others, loan lectures with lantern-slides sent to schools outside Philadelphia, and school collections given, not lent, to the schools of Pennsylvania. Full details of these last are given in this well-illustrated pamphlet.

THE recently published annual report of the Yorkshire Philosophical Society for 1920 reminds us that with 1922 the society reaches its centenary. It sprang from the suggestion that a museum should be founded to receive the bones just discovered in the Kirkdale Cave. Famous men have been connected with the society. It was the parent of the British Association in 1831 and of the Museums Association in 1888, while in local archæology it has done, and is doing, admirable work. Under the present keeper of the museum, Dr. Collinge, the zoological collections are being put in good order, and Mr. J. Hetherton has lately placed a wood of considerable area at the disposal of the society for use as a bird sanctuary. The geological collections contain many valuable fossils, and the report concludes with "Notes on the Later Tertiary Invertebrata" of these islands by the veteran Mr. Alfred Bell; most of the species are in the society's museum.

THE last annual report of the National Museum of Wales records some advance in completing the western section of the new building. The reserve galleries and basement are now occupied, and the keepers of art, botany, and zoology, with their staffs, are installed in their new quarters, while the department of geology has temporary accommodation. These departments are, however, hindered by lack of museum furniture, for which the available funds are insufficient. The museum worthily acts up to its title of "National," co-operating with all relevant bodies in the Principality, with mine-owners, quarry-owners, and industrial firms, and in particular with the faunistic survey of the County of Glamorgan and the local education authorities. A number of accessions of local interest, as well as many others, are recorded by all the departments. It is not in man to command financial support, but Dr. Hoyle and his able staff undoubtedly deserve it.

THE geological model of the Bristol district which has recently been placed in the Bristol Museum and Art Gallery depicts the relief and the geological outcrops of the district on a horizontal scale of 3 in. to 1 mile and a vertical scale of 1 in. to 500 ft. An explanatory guide to this relief map has been prepared by Prof. S. H. Reynolds. The pamphlet includes a description of the present land surface and a sketch of the geological history designed to explain the origin of the chief physical features. A short account of the distribution of the geological formations is also given, and this is followed by a section which describes the roads and railways of the district in their relation to the surface relief. The pamphlet should prove indispensable to those students and teachers of geography and geology who have access to the model.

FROM the "Report on the Zoological Service for the Year 1920" we learn that the Giza Zoological Gardens have been restored to their pre-war condition of cleanliness. The number of visitors during that year was greater than in any previous year. A special feature of these gardens is the thousands of birds in a state of complete liberty which frequent the grounds, and we are glad to note that the numbers of cattle egrets, little egrets, and hoopoes which have nested there are increasing. The new building of the Giza Zoological Museum was opened in 1920. Lack of space and insufficiency of staff, however, will prevent the development of a general natural history museum. The insect collections have already been transferred to the Ministry of Agriculture and the marine invertebrates to the Sultana Hydrobiological Institute. The Zoological Service of Egypt is doing a useful work in the preservation of the natural fauna of the country both by protecting game and nesting birds and by controlling beasts of prey. Special success has attended its efforts to protect birds from the birdlimers, to preserve the breeding colonies of the cattle egrets, and to keep down the number of jackals.

AN interesting addition to the flowering plants of the British flora is announced in the November issue of the *Naturalist*. Mr. R. W. Butcher found *Tillaea aquatica* at Adel, near Leeds, in September, where it was the dominant plant growing in abundance on the drying-up mud on the margin of a pool. Dr. G. C. Druce has examined the plant, and agrees that it is probably a true native species or one brought there by purely natural means. The typical plant is known from Germany, and a sub-species also occurs in France and Italy.

THE December issue of the Journal of the Franklin Institute contains a paper by Mr. Enoch Karrer, of the Nela Research Laboratories, Cleveland, Ohio, on the shape assumed by a deformable body immersed in a moving fluid. The author's attention was directed to the subject by the behaviour of a drop of mercury just above a constriction in a vertical glass tube up which a current of gas was flowing. As the speed of the gas was increased the drop was raised above the constriction and assumed a slightly egg-shaped form with its larger end downwards. With increase of speed it elongated, keeping its larger end downwards, and finally a small drop detached itself from its upper end. From these observations the author concludes that a deformable body in a moving fluid assumes a stream-line shape. He supports his conclusion by figures of snow drifts and snow bosses from Cornish's "Waves of Sand and Snow," of egg-shaped boulders with their long axes in the direction of the wind and their big ends up-wind, and by the shapes of moths, birds, and fishes. By analogy with "geotropism"—the adjustment of organisms under gravity—the author proposes to name this new principle "rheotropism."

THE Meteorological Office of the Air Ministry has recently issued as No. 18 of the Geophysical Memoirs a memoir by Mr. W. H. Dines on observations on radiation from the sky and an attempt to determine the atmospheric constant of radiation. The measurements were made at Benson during 1920. The sky was divided into six zones of 15° width, and the radiation was taken at the altitudes corresponding to the mean altitude of the zones. The final form of instrument used was a thermopile of copper-eureka junctions designed by L. F. Richardson. The observations were made at, or a little after, sunset, and are classified under "clear sky," "overcast sky," and "very clouded sky." By suitable methods the amount of radiation received from each zone on a horizontal surface at ground-level is calculated, and the final results show that the average daily supply of heat from the atmosphere throughout the year falling on one square centimetre in the South of England on clear days is 506 gram calories. For fully clouded skies the value is about 700, with a general mean for all days of about 600. For a mean temperature of 50° F. the outward radiation from the earth is 711 gram calories, so that the net or effective radiation for a clear sky is rather more than 200 gram calories. This is 25 per cent. less than the values usually given, which, however, have been mostly obtained at much greater altitudes than Benson (186 ft. above sea-level).

THE commercial transmission of power conveyed electrically by overhead wires has made the study of lightning arresters of great importance. In places where thunderstorms are violent, such as in certain parts of South Africa or where the lines have to traverse mountainous regions, the use of efficient lightning arresters is a necessity. In this connection the papers published in the *General Electric Review* for November and December last by J. L. R. Hayden and N. A. Lougee are of value. The object of lightning arresters is to afford protection against sudden rushes of electricity at high potential in the lines due to atmospheric disturbances. To get similar electric surges in the laboratory they build up a battery of glass-plate condensers which by means of the kenotron (a two-electrode thermionic valve for rectifying currents of high voltage) can be charged by an alternating-current transformer to 30,000 volts; 200 of these condensers are used, which can be connected in parallel or in two groups of 100 in parallel or in four groups of 50 in parallel. When they are all in parallel the capacity is 1·6 microfarads, and at 30 kilovolts the energy stored is 720 joules. With the arrangements they used they got a maximum discharge of 9500 amperes at 120,000 volts, the discharge frequency being 126,000. Three types of lightning arrester were examined: (1) the horn type with resistance in series, (2) the electrolytic type, and (3) the multigap type. Their results prove that the resistance in the horn type was very detrimental, that the electrolytic type was very efficient, but that its expense limited its use, and that the multigap type was an efficient and cheap type of lightning arrester.

MESSRS. LONGMANS AND CO. have in the press "Modern Practice in Heat Engines," by T. Petrie, which is intended to form a companion to the late W. Inchley's "Theory of Heat Engines." It deals with the subject of power from heat engines as a whole, and attempts to show how far theory may be applied to the design of modern types. The book is divided into three sections, steam boilers, steam prime movers, and internal-combustion engines, each section containing a descriptive chapter on the latest types with sectional illustrations which, in many cases, approximate to working drawings. Another book announced by the same publishers is a translation, by Dr. J. S. Thomas, of Prof. A. Smits's "The Theory of Allotropy."

MR. F. EDWARDS, 83 High Street, Marylebone, W.1, has just issued a Hand-list (No. 422) of Biographies, Autobiographies, Diaries, Journals, Correspondence, etc., of Famous Men and Women. Many men of science are represented in the catalogue.

MR. E. MARSDEN, one of the authors of "Geography for Junior Classes," of which a short notice appeared in NATURE of December 22 last, writes to point out that the phrase "lines and belts of equal heat," which the reviewer remarked "is bad anywhere," occurs also in Geikie's "Elementary Lessons in Physical Geography" and in the revised edition of Huxley's "Physiography." The use of the phrase in other books does not, however, alter the reviewer's objection to it.

IN an article entitled "Fisheries Biology" in NATURE of December 29, p. 585, it is stated that "the spur-dog and nurse-hound are viviparous." Mr. E. Ford writes to inform us that the term "nurse-hound" is applied at Plymouth to *Scyliorhinus stellaris,* which is not viviparous. We understand from the writer of our article that confusion has arisen from the fact that the name "nurse-hound" is also used by fishermen in his district to refer to *Mustelus vulgaris,* which is viviparous.

Our Astronomical Column.

THE SHOWER OF JANUARY METEORS.—A rather abundant display of these objects was observed on the night following January 3. Mr. W. F. Denning writes as follows:—At Bristol the early part of the evening was clear, and between 5.40 and 6.50 p.m. meteors appeared at the rate of thirty per hour. Clouds, wind, and sleet then interrupted watching until about 9 p.m., when the atmosphere again cleared, and the remainder of the night was splendidly favourable for observation. The shower, however, declined in numbers strikingly, for in the two or three hours preceding midnight the hourly rate of apparition was only twelve, and there was a further falling off as the night progressed. The radiant point was at 232°+53°. Large meteors were frequent, and a number of them have been recorded at several stations. Miss A. Grace Cook witnessed the event from Stowmarket and saw a considerable number of meteors on the two nights January 2 and 3. She registered a fair proportion of large ones, and found the maximum intensity occurred in the early part of January 3. The radiant was at 231°+53°.

SPECTRAL EVIDENCE OF A PERSISTENT AURORA.—Bulletin No. 76 (vol. 3, No. 1) of the Lowell Observatory, contains an interesting account by Mr. V. M. Slipher of his successful attempts to show that the aurora is always present in the night sky. Working on the fact that the spectrum of the aurora consists of certain emissions, of which one in the yellow-green is so intense relatively as to contain a considerable portion of the total auroral light, he finds it possible to record this line with an exposure of only a few hours, even if there be moonlight. The instrument he employs is a spectrograph with a 66 degree flint glass prism, and a Dallmeyer lens of f/1·9 ratio, the photographic plates being of the Cramer isochromatic brand. This spectrograph was usually simply pointed to the sky, but in some cases a small objective was placed in front of it. All the exposures he made showed the characteristic auroral line, thus proving the existence of auroral illumination, persistent or permanent at least over the period covered by his series of plates, which commenced in the year 1915. The two plates which accompany his paper show the auroral line clearly on both moonlight and moonless nights.

MOVEMENTS IN SPIRAL NEBULÆ.—Dr. Jeans exhibited at the November meeting of the Royal Astronomical Society some slides sent by Dr. Van Maanen, showing movements in the spirals M 101 and M 33. He demonstrated that the only tenable motions that would conserve the equiangular spiral forms were compounded of pure rotation and motion along the arms. The latter type greatly predominates in these nebulæ, and the indicated times of revolution round the nucleus are 85,000 years and 160,000 years respectively. Since only two whorls of nebulosity can be traced, implying a duration of a third of a million years, it was conjectured that the outer whorls may have become invisible, just as the puffs of steam from a locomotive soon dissipate. By the combination of observed shifts with line-of-sight velocities, a distance of 2000 parsecs was deduced for M 33. This would be fatal to the island-universe hypothesis, since it would place the object well within the confines of the galaxy. There have been fairly regular oscillations of opinion on the hypothesis, the prevailing view at the Royal Astronomical Society's meeting being hostile to it.

A BRIGHT FIREBALL.—Mr. G. E. Sutcliffe writes from Shahpur, Ahmedabad, India, that on November 22 last, at about 6 a.m., when gazing towards the Southern Cross, he saw a large fireball emerging from the horizon. The object appeared to be approaching him and to move more slowly than ordinary shooting stars. It became intensely brilliant. Its motion was directed nearly from south to north, and it passed a little to the east of his zenith. During the early part of its track the fireball was globular in shape, and it had a distinct tail like a comet.